Preliminary studies on the use of kolanuts (*cola nitida*) for soft drink production

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Abstract

The fresh nuts (seeds) of kola (*Cola nitida*) were used in the preparation of kola soft drink.

Proximate analysis of the nut was carried out to determine its moisture, ash, protein, carbohydrate, fat and caffeine contents. The pH, total solids, specific gravity, caffeine and sensory attributes of the developed kola soft drink were compared with some commercial popular types.

The results indicated that the fresh nut contained 8.90% protein, 0.92% fat, 2.40% Ash ad 1.50% caffeine. Also, the developed kola drink whose pH, specific gravity, total solids and caffeine were 5.40, 1.040, 10% and 0.01 respectively was acceptable to local tasters, making economic utilization of kolanut possible through the production of value-added products and increasing the income of both primary producers and industrial users of the nuts.

Introduction

The cola species, a tropical tree crop which belongs to the family steruliaceae (Ogutuga 1975) is native to coastal regions of West Africa. This crop is socio-economically important because kolanuts (its primary product) is used by the natives for ceremonies and chewed as a masticant and stimulant. The nut is also source of caffeine which is used in pharmacological industries (Oludemokun 1983).

Egbe and Oladokun (1987) reported that there are over forty cola species out of which *Cola nitida* and *Cola acuminata* are of major economic and social importance in Nigeria. In Nigeria, fresh and cured kolanuts chewing are prominent as a masticant. Ogutuga (1975) reported that small doses of kolanut increase mental activity, reduce the need to sleep, and also dispel hunger and thirst. It is for this reason that kolanut chewing has become very popular among students, drivers and many other consumers who need to remain active for unusually long period. In some developed countries, however kolanuts extract is used industrially for the manufacturing of many cola-type soft drink flavours (Beattle, 1970), as a source of caffeine used for manufacture of pharmaceutical products and essential oils (Olounloyo 1979) and as a main ingredient in production of heat-tolerant chocolate bars (Williams 1979). In additions caffeine is known to be a fat burner and therefore to be beneficial in assisting weight loss (Blader, 2000). As a result of the commercial importance of kolanut, most of the research work in Nigeria to date has been done mainly on *C. nitida* (Oladokun, 1982), the cola of commerce.

Presently the bulk of kolanuts being produced in Nigeria are either consumed fresh locally or exported as sun dried nuts to some drier areas of Africa where they are used as masticants or as a source of colourant for cloth dyeing with little or no industrial use locally. There is therefore the need to conduct studies locally into the industrial utilisation of kolanuts. Hence the objective of this work was to determine the proximate analysis of kolanuts and investigate the possibility of utilising them in the preparation and development of new value-added product such as kola soft drink.

Materials and methods

Cured and stored kolanuts of *Cola nitida* variety obtained from kola research plot at the Cocoa Research Institute of Nigeria, Ibadan, were used.

The method of Seiki (1975) was employed with little modification. 20 gms of the cured kolanuts were cut into small dices of 5 mm^2 washed with distilled water and later boiled in 6 litres of water for 30 minutes to extract colour, caffeine and other constituents of the unit.

The supernatant was decanted and acidified with citric acid up to pH of 5.0. Sucrose (300gm) made into syrup were added at 20° C. To preserve the solution, 0.3% sodium Benzoate solution was added. The solution so produced and referred to here as the soft drink was chilled, decanted into a glass bottle. The bottled drink was pasteurised at 80° C for 10 minutes. The product was subjected to chemical and sensory analyses.

Analysis

The moisture, Ash, Protein, carbohydrate, fat and caffeine content of the kolanuts were determined and the pH, total solids, specific gravity and caffeine content of the Associates of Official Analytical Chemists (1990). Product shelf life was determined by visual inspection such as level of sedimentation, brilliance (clarity)

Table 1. Chemical composition of kolanut (*Cola nitida*)

Constituent	Average (%) (wt/Vol.)
Moisture	55.00
Ash	2.40
Lipid	0.92
Protein	8.90
Carbohydrate	88.10
Caffeine	1.50

Table 2. Physico-chemical and microbiological analyses of kolanut (*Cola nitida*) Drink as compared with some commercial soft drink.

	Kola drink	Coca-cola	Africola	Pepsi-cola
pH	5.4	5.2	5.1	5.1
Total	10	10	12	12
Specific gravity	1.04	1.04	1.04	1.05
Caffeine content	0.010	0.010	0.011	0.098
Sedimentation	N	N	N	N
Cloudiness	Slight	N	N	N
Growth on nutrient agar	N	N	N	N
Growth on potato dextrese	N	N	N	N

Where N=Nil

Table 3. Sensory evaluation result of kola soft drink and commercially sold soft drinks

Sample No.	Taste	Colour	Brilliance/ Clarity	Gas Evolution	Overall acceptability
214	8.10	8.30	8.40	8.30	8.70
308	8.60	8.30	8.50	8.40	8.80
522	8.40	8.40	8.70	8.70	8.80
640	8.80	8.40	8.60	8.70	9.00
Means	8.47	8.27	8.55	8.52	8.82
P	N.S	N.S	N.S	N.S	N.S
(V(%)	21.52	24.93	27.07	22.10	21.94
SE	0.265	0.297	0.284	0.223	0.280

Where 214 = Formulated kola drink, 308 = Afri Cola, 522 = Pepsi cola, 640 = Coco-cola, N.S = Not Significant

and fungal growth over a period of 6 months on storage. Plate count analysis was also carried out using nutrient agar and potato dextrose. Sensory Evaluation of the kola soft drink was carried out using untrained panelists with hedonic scale of 9-1 ranging from "like extremely (9)" to "dislike extremely (1)". The data collected were analysed statistically using analysis of variance for taste, colour, clarity/ transparency gas content and overall acceptability.

Results and discussion

The results of proximate analysis were presented in **Table1**. Protein content of 8.90% was within the range that was obtained by previous workers such as Eka (1971) who recorded 8.60% and Ogutuga (1975) who recorded 8.06%. Caffeine 1.50%, Ash 2.40% and carbohydrate 88.10% contents were similar to those obtained by the previous workers. Also the fat content of 0.92% differed significantly from that of Eka (1971) which was 6.25%. But similar to that of Ogutuga which was 0.98%.

The essential attributes (i.e. pH, total solids, specific gravity caffeine content and shelf life) of the developed kola soft drink were similar to those of other commercial soft drinks as shown in **Table 2**. These indicated that this newly produced kola soft drink could compete favourably with locally and internationally made ones which are currently in the market. Although sedimentation was not recorded, slight cloudiness was noticed in the bottled kola soft drink. There is therefore the need for further work in order to improve upon the quality and enhance its marketability. There was no fungal or microbial growth noticed on the plate when nutrient agar and potato dextrose agar were used. This showed that the drink was free from any spoilage micro-organisms. The result of the sensory evaluation of the kola soft drinks presented on **Table 3** also indicated that there were no significant differences between this kola soft drink and the commercial soft drink. Hence the high level of acceptability by testers during this work.

Conclusion

The result showed that this kola soft drink which was produced from fresh raw materials compared favourably with existing commercial ones which are known to be formulated from concentrates. This product has additional advantages of being more of being cheaper and more affordable to consumers.

The result also showed that kolanut could be utilized in the producing countries to produce value added products such as the kola drink reported here and thereby create and increase the income of farmers and industrialists in this country.

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